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EXAMINER	
DOTE, JANIS L	

ART UNIT	PAPER NUMBER
1756	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/679,480	SUZUKI ET AL.	
	Examiner	Art Unit	
	Janis L. Dote	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-7,10,11,15-17,20,24-26,29,33-35,38-45,47 and 48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 5-7, 10, 11, 15-17, 20, 24-26, 29, 33-35, 38-45, 47, and 48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/18/05;10/3/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on Oct. 18, 2005, has been entered.

2. The examiner acknowledges the cancellation of claim 46 and the amendments to claims 1, 10, 20, 29, and 48 set forth in the amendment filed on Oct. 18, 2005. Claims 1, 5-7, 10, 11, 15-17, 20, 24-26, 29, 33-35, 38-45, 47, and 48 are pending.

3. The examiner has considered the copending US applications listed in the "List of related cases" in the Information Disclosure Statements filed on Jul. 18, 2005, and Oct. 3, 2005.

4. The rejections of claims 1, 5-7, 10, 11, 15-17, 20, 24-26, 29, 33-35, and 38-48 under 35 U.S.C. 112, second paragraph, set forth in the office action mailed on May 2, 2005, paragraph 5, have been withdrawn in response to the amendments to claims 1,

10, 20, and 29 set forth in the amendment filed on Oct. 18, 2005.

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1, 5, 38, 39, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent 8-029998 (JP'998), as evidenced by applicants' admission at page 31, lines 9-11, of the instant specification (applicants' admission I), combined with: (1) Japanese Patent 07-295250 (JP'250); (2) US 5,250,990 (Fujimura); and (3) US 4,987,046 (Kutami). See the DERWENT machine-assisted translations of JP'998 and JP'250, and the Japanese Patent Office (JPO) machine-assisted translation of JP'998 for cites.

JP'998 discloses an electrophotographic photoreceptor comprising a conductive aluminum drum having a diameter of 80 mm, an intermediate layer, a charge generation layer, and a charge transport layer. The charge generation layer comprises 3 parts by weight of a τ-form metal-free phthalocyanine pigment and 3.5 parts by weight of the asymmetric bisazo pigment (I-24) that meets the limitations of formula (VII) recited in instant claim 38. DERWENT translation, Table 1B(6), compound (I)-24;

paragraphs 0035 and 0042; and example 8 in paragraph 0047; and JPO translation, paragraph 0035, lines 4-5. The weight ratio of phthalocyanine pigment to bisazo pigment is 3:3.5, which is within the range of 1:5 to 5:1 recited in instant claim 1. The intermediate layer has a layer thickness of 0.1 μm, which meets the layer thickness range of "up to 10 μm, excluding 0" recited in instant claim 48. See the JPO translation, paragraph 0035, lines 4-5. (Note that the DERWENT translation of paragraph 0035 is missing the text in lines 4-5 of the JPO translation.) JP'998 also discloses that the asymmetric bisazo pigment can equally be the asymmetric bisazo pigment (I-29), which meets the limitations of formula (VIII) recited in instant claim 39. See the DERWENT translation, Table 1-(7), compound (I)-29; paragraph 0043; and example 9, paragraph 0047. According to JP'998, its photoreceptor has high spectral sensitivity in the visible light to the near infrared region. DERWENT translation, paragraph 0004.

JP'998 does not exemplify a photoreceptor comprising an intermediate layer comprising titanium oxide as recited in the instant claims. However, JP'998 discloses that a fine-powder pigment of a metallic oxide, such as titanium oxide, may be added to the binder resin of its intermediate layer to prevent the occurrence of moire and to reduce the residual electric

potential of the photoreceptor. DERWENT translation, paragraph 0030. These are the same benefits sought by applicants. See the instant specification, page 31, lines 9-11.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of JP'998, to add the metal pigment titanium oxide to the intermediate layer in the photoreceptor disclosed by JP'998 because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that prevents the occurrence of moire and exhibits a reduction in residual electric potential.

JP'998 also does not disclose that the charge transport layer comprises a sulfur-containing compound as recited in the instant claims. However, JP'998 discloses that the charge transport layer can comprise an antioxidant. DERWENT translation, paragraph 0027.

JP'250 discloses sulfur-containing compounds that meet the compositional limitations of formulas (III), (S-1), (S-2), and (S-3) recited in the instant claims. JP'250 discloses that said sulfur-containing compounds can be used as antioxidants in charge transport layers of photoreceptors. DERWENT translation, paragraph 0007, compounds (I-1) to (I-4) at paragraph 0026, compounds (II-1) to (II-3) at paragraph 0028. JP'250

exemplifies a charge transport layer comprising 1.5 parts by weight of the sulfur-containing antioxidant per 100 parts by weight of the charge transport material. The amount of 1.5 parts by weight was determined from the information provided in the DERWENT translation, paragraph 0050. The amount of 1.5 parts by weight per 100 parts by weight of the charge transport material is within the range of "0.1 to 5 parts by weight . . . based on 100 parts by weight" of the charge transport material recited in instant claim 1. JP'250 discloses that said sulfur-containing compounds prevent the deterioration of the photoreceptor due to ozone in the ambient air or due to strong light irradiation. The photoreceptor is said to have improved potential stability over long periods of time. DERWENT translation, paragraphs 0003, 0006, and 0007, and paragraph 0054, lines 1-4. JP'250 further teaches that its sulfur-containing antioxidants provide photoreceptors with improved stability of electrification and sensitivity over long periods of time compared to known hindered phenol antioxidants. DERWENT translation, Table 1, comparative examples 3 and 4, and paragraph 0054, lines 14-18.

It would have been obvious for a person having ordinary skill in the art to use JP'250's sulfur-containing compounds that meet the compositional limitation of formulas (III), (S-1),

(S-2), or (S-3) recited in the instant claims, in an amount of 1.5 parts by weight per 100 parts by weight of the charge transport material in the charge transport layer, as the antioxidant in the photoreceptor rendered obvious over the teachings of JP'998. That person would have had a reasonable expectation of successfully obtaining a photoreceptor that has improved potential stability over long periods of time and that provides stable toner images after many repeated copies.

JP'998 does not exemplify a photoreceptor comprising an aluminum drum having a drum diameter of 30 mm as the electroconductive substrate as recited in instant claim 1. However, JP'998 does not exclude the use of an aluminum drum having a diameter of 30 mm. JP'998 discloses that the electroconductive substrate can be an aluminum pipe. DERWENT translation, paragraph 0017.

According to Fujimura, "seamless cylindrical substrate [i.e., the drum]" for photoconductive members is attracting attention in recent years because the electrophotographic apparatuses comprising said photoconductors is simple to make, low in cost and compact, and the photoconductive members can be made smaller. Fujimura, col. 1, lines 52-57. Fujimura also discloses that "in recent years, with the process of miniaturization of electrophotographic apparatus, it has been

desired to develop a space-saving type electrophotographic apparatus which is inexpensive and transportable, directed to individual use . . . an apparatus using a drum with a small diameter and a blade cleaning system, is most suitable." Fujimura, col. 1, lines 59-66.

According to Kutami, prior art aluminum drum bases made by extrusion and machining the surface of said extruded drums or made by a drawing and ironing process have shortcomings, e.g., high manufacturing costs, poor productively, or the inability to form photoreceptors having the required length of 210 mm with a drum diameter of less than 40 mm. Kutami, col. 1, lines 13-57. Kutami teaches an electrically conductive aluminum drum for use in electrophotographic photoreceptors, which is lightweight and thin-walled. The drum can be continuously manufactured at a low cost without any restriction of the length thereof. Thus, the drum is free of the above-mentioned shortcomings of the conventional drums used in electrophotographic photoreceptors. Col. 1, lines 60-68. Kutami further discloses that the dimensional accuracy of the drum is remarkably high, and the photoreceptors comprising said drum as the electrically conductive base provide clear images uniformly without any abnormalities due to the flaw and joint on the surface of the photoconductive drum. Col. 14, lines 48-53. The Kutami

aluminum drum is obtained by forming an aluminum sheet in the form of a tube having a seam and welding the seam of the tube by resistance welding to form an "electroseamed" tube. The aluminum tube has an outer diameter of 30 mm and a length of 260 mm. Col. 2, lines 34-41; and example 1 at col. 7, line 61, to col. 8, line 5.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Fujimura and Kutami, to use the aluminum drum having an outer diameter of 30 mm as taught by Kutami as the electroconductive substrate in the photoreceptor rendered obvious over the combined teachings of JP'998 and JP'250. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that is easily manufactured, light in weight, that has high dimensional accuracy, and that is small in size, to be used in miniaturized space-saving electrophotographic devices, and that provides clear images uniformly without any abnormalities due to the flaw and joint on the surface of the photoconductive drum, as discussed by Kutami.

7. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'998, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami, as

applied to claim 1 above, further combined with additional teachings in JP'998. See the DERWENT translations of JP'998 and JP'250, and the JPO translation of JP'998 for cites.

JP'998, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami renders obvious an electrophotographic photoreceptor as described in paragraph 6 above, which is incorporated herein by reference.

JP'998 does not exemplify an intermediate layer having a layer thickness of 3 m as recited in instant claim 47. However, as discussed in paragraph 6 above, JP'998 discloses that a fine-powder pigment of a metallic oxide, such as titanium oxide, may be added to the binder resin of its intermediate layer to prevent the occurrence of moire and to reduce the residual electric potential of the photoreceptor. DERWENT translation, paragraph 0030. These are the same benefits sought by applicants. See the instant specification, page 31, lines 9-11. JP'998 also teaches that intermediate layer may have a layer thickness of "0 to 10 μm." DERENT translation, paragraph 0031. The range of "0 to 10 μm" encompasses the thickness of 3 μm recited in instant claim 47.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of JP'998, to add the metal pigment titanium oxide to the intermediate layer and to

adjust, through routine experimentation, the thickness of the intermediate layer, such that the thickness is 3 μm, as recited in instant claim 47, in the photoreceptor rendered obvious over the combined teachings of JP'998, JP'250, Fujimura, and Kutami. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that prevents the occurrence of moire and exhibits a reduction in residual electric potential, and the benefits disclosed by JP'250, Fujimura, and Kutami.

8. Claims 10, 11, 15, 20, 24, 29, 33, and 40-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'998, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami, as applied to claims 1, 5, 38, and 39 above, further combined with US 5,047,803 (Kanoto). See the DERWENT translations of JP'998 and JP'250, and the JPO translation of JP'998 for cites.

JP'998, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami renders obvious an electrophotographic photoreceptor as described in paragraph 6 above, which is incorporated herein by reference.

JP'998 does not disclose that the electrophotographic photoreceptor can be used in a process cartridge or an apparatus

as recited in the instant claims. Nor does JP'998 disclose that its photoreceptor can be used in the imaging forming method recited in the instant claims.

However, the use of process cartridges in electrophotographic apparatuses are well-known in the art.

Kanoto discloses that process cartridges in electrophotographic apparatuses are well-known in the art. Kanoto discloses that process cartridges comprising an electrophotographic photoreceptor and at least one processing means, such as a contact roller charger or corona charger, a developing device, a cleaner, and other elements are widely used in the field of image forming apparatuses that are small and that do not require maintenance. Col. 1, lines 18-28, and col. 3, lines 36-38. Kanoto discloses an imaging forming apparatus comprising a process cartridge that is easily dismounted from the main assembly of the image forming apparatus. Col. 1, lines 60-63. Kanoto shows an example of such an apparatus in Fig. 1. The apparatus comprises a process cartridge **100**, a laser beam scanner **7** as the image-wise exposure source, an image transfer roller **8** to transfer the toned image from the photoreceptor to a receiving member, and a pair of fixing rollers **15a** and **15b** to fix the toned image on the receiving member. The process cartridge **100** comprises a

photosensitive drum **1** (i.e., photoreceptor), a charging roller **2**, a developing device **3**, and a cleaning device **4** to remove residual toner or other contaminants from the photoreceptor after development. See Fig. 1, and col. 2, line 37, to col. 4, line 38. Kanoto discloses that the charging roller **2**, the developing device **3**, or the cleaning device **4** need not be contained in the process cartridge **100**, but can be part of the image forming apparatus. Col. 2, lines 57-60. Kanoto further discloses that the developing device **3** in the process cartridge or image forming apparatus can reverse develop the electrostatic latent image formed on the photoreceptor with a developer having the same polarity as the charge remaining on the photoreceptor. Col. 3, lines 57-61. Kanoto further discloses that its imaging apparatus performs an image forming process that meets the process steps recited in instant claim 29, but for the step of the providing the particular photoreceptor. Kanoto, col. 3, line 49, to col. 4, line 38.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Kanoto, to incorporate the electrophotographic photoreceptor rendered obvious over the combined teachings of JP'998, JP'250, Fujimura, and Kutami in Kanoto's detachable process cartridge in its image forming apparatus. That person would have had reasonable

expectation of successfully obtaining a reversal development imaging method and an image forming apparatus comprising an easily detachable process cartridge having the benefits of being small and free from maintenance that provide stable toner images after many repeated runs as disclosed by JP'250 and that provide clear images uniformly without any abnormalities due to the flaw and joint on the surface of the photoconductive drum, as discussed by Kutami.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'998, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami, as applied to claim 5 above, further combined with US 4,507,374 (Kakuta), as evidenced by applicants' admission at page 21, lines 11-19, of the instant specification (applicants' admission II), and DERWENT abstract Acc. No. 1983-816039. See the DERWENT translations of JP'998 and JP'250, and the JPO translation of JP'998 for cites.

JP'998, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami renders obvious an electrophotographic photoreceptor as described in paragraph 6 above, which is incorporated herein by reference.

As set forth in paragraph 6, supra, JP'998 discloses that the phthalocyanine pigment is a τ-form metal-free phthalocyanine. However, JP'998 does not disclose that the τ-form metal-free phthalocyanine pigment has the X-ray diffraction pattern recited in the instant claims. Kakuta discloses a τ-form metal-free phthalocyanine pigment having a X-ray diffraction pattern with characteristic Bragg angles (2θ ± 0.2°) of 7.6°, 9.2°, 16.8°, 17.4°, 20.4°, and 20.9°. Col. 2, lines 16-19, col. 4, lines 38-42, 53-55, and Fig. 4. Kakuta discloses that photoreceptors comprising said phthalocyanine exhibits high sensitivities to longer wavelength light. Col. 1, lines 58-63. Kakuta discloses that said phthalocyanine exhibits a maximum sensitivity at 790-810 nm, and is most useful in photoconductors image-wise exposed to a semiconductor laser. Col. 9, lines 38-41.

Kakuta does not disclose that the X-ray diffraction pattern of its τ-form metal-free phthalocyanine exhibits Bragg angles of 21.7° and 27.6° as recited in the instant claims. However, the instant specification discloses that the τ-form metal-free phthalocyanine having the X-ray diffraction pattern recited in the instant claims can be prepared by a method described in Japanese Patent 58-182639 (JP'639). Instant specification, page 21, lines 11-19. Kakuta is the US equivalent of JP'639.

See the DERWENT abstract Acc. No. 1983-816039. Because all six Bragg angles disclosed by Kakuta correspond to Bragg angles recited in the instant claims, and because Kakuta's τ-form metal-free phthalocyanine is obtained by a method that makes a τ-form metal-free phthalocyanine having the X-ray diffraction pattern recited in the instant claims, it is reasonable to presume that Kakuta's τ-form metal-free phthalocyanine has a X-ray diffraction pattern that meets the limitation recited in the instant claims. The burden is on applicants to prove otherwise. In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

It would have been obvious for a person having ordinary skill in the art to use Kakuta's τ-form metal-free phthalocyanine pigment as the τ-form metal-free phthalocyanine in the photoreceptor rendered obvious over the combined teachings of JP'998, JP'250, Fujimura, and Kutami. That person would have had a reasonable expectation of successfully obtaining a photoreceptor having improved sensitivity to the longer wavelength region, and having the benefits disclosed by JP'998, JP'250, Fujimura, and Kutami.

10. Claims 16, 25, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'998, as evidenced by applicants' admission I, combined with JP'250, Fujimura, Kutami, and Kanoto,

as applied to claim 15, 24, and 33 above, further combined with Kakuta, as evidenced by applicants' admission II and DERWENT abstract Acc. No. 1983-816039. See the DERWENT translations of JP'998 and JP'250, and the JPO translation of JP'998 for cites.

JP'998, as evidenced by applicants' admission I, combined with JP'250, Fujimura, Kutami, and Kanoto renders obvious an imaging apparatus comprising a process cartridge and an image forming method as described in paragraph 8 above, which is incorporated herein by reference.

JP'998 discloses that the phthalocyanine pigment is a τ-form metal-free phthalocyanine. JP'998 does not disclose that the τ-form metal-free phthalocyanine pigment has the X-ray diffraction pattern recited in the instant claims. However, Kakuta discloses a τ-form metal-free phthalocyanine pigment that appears to have a X-ray diffraction pattern that meets the limitations recited in the instant claims. The discussions of Kakuta, applicants' admission II, and the DERWENT abstract, in paragraph 9, supra, are incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art to use Kakuta's τ-form metal-free phthalocyanine pigment as the τ-form metal-free phthalocyanine in the photoreceptor rendered obvious over the combined

teachings of JP'998, JP'250, Fujimura, and Kutami, and to use the resultant photoreceptor in the apparatus disclosed by Kanoto. That person would have had a reasonable expectation of successfully obtaining a photoreceptor having improved sensitivity to the longer wavelength region, thereby providing an electrophotographic image forming apparatus comprising an easily detachable process cartridge and a reversal development imaging method that provide good toner images as taught by JP'250 and that provide clear images uniformly without any abnormalities due to the flaw and joint on the surface of the photoconductive drum as discussed by Kutami.

11. Claims 1, 5, 38, 39, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent 7-128890 (JP'890), as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami. See the DERWENT machine-assisted translations of JP'890 and JP'250 for cites.

JP'890 discloses an electrophotographic photoreceptor comprising a conductive aluminum drum having a diameter of 80 mm, an intermediate layer, a charge generation layer, and a charge transport layer. The intermediate layer has a thickness of 0.1 μm. The charge generation layer comprises 2.5 parts by weight of an X-form metal-free phthalocyanine pigment and

3 parts by weight of the asymmetric bisazo pigment (I-24), which meets the limitations of formula (VII) recited in instant claim 38. Translation, Table 1B(6), compound (I)-24; paragraphs 0035 and 0042; and example 8 in paragraph 0047. (Note that the DERWENT translation paragraph 0042 incorrectly states that "3.0 weight parts and 2.5 weight-parts of X type metal-less phthalocyanines were added for the illustration compound (1)-24 disazo pigment." Paragraph 0042 in JP'890 states that 3.0 weight parts of the compound (1)-24 and 2.5 weight parts of X type metal-less phthalocyanine are used to form the charge generation layer.) The weight ratio of phthalocyanine pigment to bisazo pigment is 2.5:3, which is within the range of 1:5 to 5:1 recited in instant claim 1. JP'890 also discloses that the asymmetric bisazo pigment can equally be the asymmetric bisazo pigment (I-29), which meets the limitations of formula (VIII) recited in instant claim 39. See the translation, Table 1-(7), compound (I)-29; paragraph 0043; and example 9, paragraph 0047. According to JP'890, its photoreceptor has high spectral sensitivity in the visible light to the near infrared region. Translation, paragraph 0004.

JP'890 does not exemplify a photoreceptor comprising an intermediate layer comprising titanium oxide as recited in the instant claims. However, JP'890 discloses that a fine-powder

pigment of a metallic oxide, such as titanium oxide, may be added to the binder resin of its intermediate layer to prevent the occurrence of moire and to reduce the residual electric potential of the photoreceptor. Translation, paragraph 0030. These are the same benefits sought by applicants. See the instant specification, page 31, lines 9-11.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of JP'890, to add the metal pigment titanium oxide to the intermediate layer in the photoreceptor disclosed by JP'890, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that prevents the occurrence of moire and exhibits a reduction in residual electric potential.

JP'890 does not disclose that the charge transport layer comprises a sulfur-containing compound as recited in the instant claims.

JP'250 discloses sulfur-containing compounds that meet the compositional limitations of formulas (III), (S-1), (S-2), and (S-3) recited in the instant claims. JP'250 discloses that said sulfur-containing compounds can be used as antioxidants in charge transport layers of photoreceptors. The discussion of

JP'250 in paragraph 6, supra, is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art to use JP'250's sulfur-containing compounds that meet the compositional limitation of formulas (III), (S-1), (S-2), or (S-3) recited in the instant claims in an amount of 1.5 parts by weight per 100 parts by weight of the charge transport material, as an antioxidant in the charge transport layer in the photoreceptor rendered obvious over the teachings of JP'890. That person would have had a reasonable expectation of successfully obtaining a photoreceptor that has improved potential stability over long periods of time and that provides stable toner images after many repeated copies.

JP'890 does not exemplify a photoreceptor comprising an aluminum drum having a drum diameter of 30 mm as recited in instant claim 1. However, JP'890 does not exclude the use of an aluminum drum having a diameter of 30 mm as the electroconductive substrate in its photoreceptor. JP'890 discloses that the electroconductive substrate can be an aluminum drum. DERWENT translation, paragraph 0017.

Fujimura discloses that compact and space-saving electrophotographic apparatus and smaller photoconductive members can be obtained by using seamless cylindrical substrates

as bases for the photoconductive members. Kutami teaches an electrically conductive aluminum drum base for electrophotographic photoreceptors having a drum diameter of 30 mm. The discussions of Fujimura and Kutami in paragraph 6 above are incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Fujimura and Kutami, to use the aluminum drum as taught by Kutami as the electroconductive substrate in the photoreceptor rendered obvious over the combined teachings of JP'850 and JP'250. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that is easily manufactured, light in weight, that has high dimensional accuracy, and that is small in size, to be used in miniaturized space-saving electrophotographic devices, and that provides clear images uniformly without any abnormalities due to the flaw and joint on the surface of the photoconductive drum, as discussed by Kutami.

12. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'890, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami, as applied to claim 1 above, further combined with additional

teachings in JP'890. See the DERWENT translations of JP'890 and JP'250 for cites.

JP'890, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami renders obvious an electrophotographic photoreceptor as described in paragraph 11 above, which is incorporated herein by reference.

JP'890 does not exemplify an intermediate layer having a layer thickness of 3 μm as recited in instant claim 47. However, as discussed in paragraph 11 above, JP'890 discloses that a fine-powder pigment of a metallic oxide, such as titanium oxide, may be added to the binder resin of its intermediate layer to prevent the occurrence of moire and to reduce the residual electric potential of the photoreceptor. Translation, paragraph 0030. These are the same benefits sought by applicants. See the instant specification, page 31, lines 9-11. JP'890 also teaches that intermediate layer may have a layer thickness of "0 to 5 μm." Translation, paragraph 0031. The range of "0 to 5 μm" encompasses the thickness of 3 μm recited in instant claim 47.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of JP'890, to add the metal pigment titanium oxide to the intermediate layer and to adjust, through routine experimentation, the thickness of the

intermediate layer, such that the thickness is 3 μm, as recited in instant claim 47, in the photoreceptor rendered obvious over the combined teachings of JP'890, JP'250, Fujimura, and Kutami. That person would have had a reasonable expectation of successfully obtaining an electrophotographic photoreceptor that prevents the occurrence of moire and exhibits a reduction in residual electric potential, and the benefits disclosed by JP'250, Fujimura, and Kutami.

13. Claims 10, 11, 15, 20, 24, 29, 33, and 40-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'890, as evidenced by applicants' admission I, combined with JP'250, Fujimura, Kutami, as applied to claims 1, 5, 38, and 39 above, further combined with Kanoto. See the DERWENT translations of JP'890 and JP'250 for cites.

JP'890, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami renders obvious an electrophotographic photoreceptor as described in paragraph 11 above, which is incorporated herein by reference.

JP'890 does not disclose that the electrophotographic photoreceptor can be used in a process cartridge or an apparatus as recited in the instant claims. Nor does JP'890 disclose that

its photoreceptor can be used in the imaging forming method recited in the instant claims.

However, the use of process cartridges in electrophotographic apparatuses are well-known in the art. Kanoto discloses an imaging forming apparatus comprising a readily detachable process cartridge. The apparatus and process cartridge meet the structural limitations recited in instant claims 10, 11, and 20, but for the particular photoreceptor. Kanoto further discloses that its imaging apparatus performs an image forming process that meets the process steps recited in instant claim 29, but for the step of the providing the particular photoreceptor. The discussion of Kanoto in paragraph 8, supra, is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Kanoto, to incorporate the electrophotographic photoreceptor rendered obvious over the combined teachings of JP'890, JP'250, Fujimura, and Kutami in Kanoto's detachable process cartridge in its image forming apparatus. That person would have had reasonable expectation of successfully obtaining a reversal development imaging method and an image forming apparatus comprising an easily detachable process cartridge having the benefits of being small and free from maintenance that provide stable toner images

after many repeated runs as disclosed by JP'250 and that provide clear images uniformly without any abnormalities due to the flaw and joint on the surface of the photoconductive drum, as discussed by Kutami.

14. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'890, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami, as applied to claim 5 above, further combined with US 3,357,989 (Byrne). See the DERWENT translations of JP'890 and JP'250 for cites.

JP'890, as evidenced by applicants' admission I, combined with JP'250, Fujimura, and Kutami renders obvious an electrophotographic photoreceptor as described in paragraph 11 above, which is incorporated herein by reference.

As set forth in paragraph 11, supra, JP'890 discloses that the phthalocyanine pigment is a X-form metal-free phthalocyanine. Translation of JP'890, examples 8 and 9. JP'890 does not disclose that the X-form metal-free phthalocyanine pigment has the X-ray diffraction pattern recited in the instant claim.

However, a X-form metal-free phthalocyanine pigment having a X-ray diffraction pattern recited in the instant claims is

well-known in the art, as shown by Byrne. Byrne discloses a X-form metal-free phthalocyanine pigment having a X-ray diffraction pattern that meets the limitations recited in the instant claim. See Fig. 1, and col. 2, lines 50-54, col. 5, lines 14-22, and reference claim 1. Byrne's phthalocyanine has photosensitivity to the wavelength region of greater than 700 nm. See Fig. 2. Byrne discloses that his phthalocyanine is especially useful as a photoconductive material in electrophotography, and that it provides "surprisingly high photosensitivity." Col. 2, lines 3-9.

It would have been obvious for a person having ordinary skill in the art to use Byrne's X-form metal-free phthalocyanine pigment having a X-ray diffraction pattern that meets the limitation of the instant claim as the X-form metal-free phthalocyanine in the photoreceptor rendered obvious over the combined disclosures JP'890, JP'250, Fujimura, and Kutami. That person would have had a reasonable expectation of successfully obtaining a photoreceptor having improved sensitivity to the longer wavelength region and having the benefits disclosed by JP'890, JP'250, Fujimura, and Kutami.

15. Claim 17, 26, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'890, as evidenced by applicants'

admission I, combined with JP'250, Fujimura, Kutami, and Kanoto, as applied to claim 15, 24, and 33 above, further combined with Byrne. See the DERWENT machine-assisted translations of JP'890 and JP'250 for cites.

JP'890, as evidenced by applicants' admission I, combined with JP'250, Fujimura, Kutami, and Kanoto renders obvious an imaging apparatus comprising a process cartridge and an image forming method as described in paragraph 13 above, which is incorporated herein by reference.

As discussed in paragraph 11 above, JP'890 discloses that the phthalocyanine pigment is a X-form metal-free phthalocyanine. JP'890 does not disclose that the X-form metal-free phthalocyanine pigment has the X-ray diffraction pattern recited in the instant claims. However, a X-form metal-free phthalocyanine pigment having a X-ray diffraction pattern recited in the instant claims is well-known in the art, as shown by Byrne. The discussion of Byrne in paragraph 14, supra, is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art to use Byrne's X-form metal-free phthalocyanine pigment as the X-form metal-free phthalocyanine in the photoreceptor rendered obvious over the combined teachings of JP'890 and JP'250, and to use said photoreceptor in the

apparatus disclosed by Kanoto. That person would have had a reasonable expectation of successfully obtaining a photoreceptor having improved sensitivity to the longer wavelength region, thereby providing an electrophotographic image forming apparatus comprising an easily detachable process cartridge and a reversal development imaging method that provide good toner images as taught by JP'250 and that provide clear images uniformly without any abnormalities due to the flaw and joint on the surface of the photoconductive drum, as discussed by Kutami.

16. Applicant's arguments filed on Oct. 18, 2005, with respect to the rejections over JP'999 and the rejections over JP'890, set forth in paragraphs 6-15 above have been fully considered but they are not persuasive.

Applicants assert that "JP'998, or JP'890 do not want to change their electro-conductive substrate is [sic] as they are not concerned with improving the properties of the electro-conductive substrate."

Applicants' assertions are not persuasive. As discussed in rejections in paragraphs 6 and 11 above, Fujimura teaches the benefits of using a "seamless cylindrical substrate [i.e., the drum] having a small drum diameter in photoreceptors. Kutami teaches a particular electroconductive aluminum drum having an

outer diameter of 30 mm. Kutami further teaches the benefits of using its aluminum drum. These references provide reason, suggestion, and motivation to use the Kutami aluminum drum as the electroconductive drum in the photoreceptors rendered obvious over the combined teachings of JP'998 and JP'250 and over the combined teachings of JP'998 and JP'250. Accordingly, for the reasons discussed in paragraphs 6-15 above, the instantly claimed photoreceptor, imaging apparatus, and image forming method are rendered obvious over the combined teachings of the prior art. The rejections set forth in paragraphs 6-15 stand.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The central fax phone number is (571) 273-8300.

Any inquiry regarding papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Claudia Sullivan, whose telephone number is (571) 272-1052.

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JANIS L. DOTE
PRIMARY EXAMINER
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JLD
Oct. 29, 2005